BOTANICAL GAZETTE.

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PINUS SEROTINÆ, or, Pines, the cones of which open *late*, often long after maturity. Michaux was the first to notice that the cones of a certain pine of the South Eastern States "arrive at maturity the second year, but do not release their seeds before the third or fourth," and he therefore named it *P. serotina*. It is now thought that this tree is scarcely distinct from the northern *P. rigida*, and I have seen specimens of the latter in which, also, some cones remained thus closed after maturity. The same fact has been observed by Dr. Chapman in a pine of Apalachicola, which he doubtfully referred to *P. inops*. Though its much more slender and delicate leaves also distinguish it from true *P. inops*, every other character is the same as in that species, so that we are justified in introducing it as *P. inops*, var. *clausa*, Chapman.

Here, then, we have two northern pines, southern forms of which show this "serotine" character. But it seems not generally known that quite a number of Western and of Mexican pines also often open the scales of their cones long after maturity or, some times, never. Those of our flora are *P. contorta* (with *P. Murrayana*, *P. Bolanderi*, etc.), *P. muricata* (*Edgariana*), *P. tuberculata* and above all *P. insignis* (*radiata*, *Monteragensis*, etc.).

The following important biological questions remain as yet unanswered, waiting for the patient investigation of students, who live in the countries where these trees grow:

1. Do the cones of these species never open as soon as ripe, but always remain closed until some time, a year or years, after maturity?

2. Do some cones open when ripe, and others of the same tree years later, and some never?

3. Does season, locality or individual character of the trees have any influence on this peculiarity?

4. At what season do the late cones open, under what physical conditions, and what is the cause of any of them remaining closed forever?

5. How many years do the seeds of such closed cones retain their vitality, and is it possible, that the seeds may germinate after the cones have fallen to the ground and rotted?

The supposition that the closed cones were sterile or contained too few seeds, did not prove correct; it seems that all cones of the several species in question contain comparatively few seeds; the seeds of closed cones, many years old, proved perfectly sweet and therefore probably sound.—G. E.

SISYRINCHIUM ARIZONICUM, *Rothrock.*—1–2 feet high; stem proper smooth, ancipital; leaves 6–12 inches long, 2–6 lines wide, gradually attenuate into an acute point, 2–4 distinct white ribs in center, and one or more less distinct toward either margin, minutely pruinose glandular, slightly roughened on the margin; spathe of two lanceolate leaves regularly tapering to the top, somewhat shorter than the peduncles of which each branch bears from 2–5 (most frequently 2); flowers yellow 1½–2 inches in diameter, bright yellow segments of the perianth broadly lanceolate; anthers 6 lines long, linear, twice as long as the dilated filaments which are united about one-third their length; style cleft half way down into linear divisions; seeds (*immature*) oval or nearly round, margined on a funiculus longer than their diameter.

This handsome species I discovered at Willow Spring, Arizona, in 1874, at an altitude of 7195 feet, in damp places, among the oak woods, (No. 238.) It will be fig. 26 of my forthcoming report.—J. T. ROTHROCK.

CHIMAJA.—A well known plant in New Mexico, where it is used to flavor roast meats, to make bitters, and as a warming stomachic, proves to be an old species, i. e. *Cymopterus Fendleri*, Gray.

It (the root) has a most pleasant anisate odor when fresh and also when cooked. What invests the plant with a special interest is the fact that its local repute has induced certain parties to propose it as the basis of another new quack medicine. It is probably of not more value than sundry other species of the order.—J. T. ROTHROCK.

SOME OREGON GRAMINEÆ.—In the Centennial exhibit of Oregon, at Philadelphia, was a collection of native grasses in bundles or sheaves, intended to show the grazing capacity of that State. I was much interested in these grasses and secured a quantity for specimens. They consisted of 10 or 12 species, of which the following named ones presented some features of interest:

Agrostis microphylla, Steud. This is called Wild Red-top, grows on bottom lands, and averages 4 feet in height. This is considered by Prof. Thurber to be one of the forms of *Agrostis exarata*, Trin. It is the form with awned flowers, and differs widely from the *A. exarata* figured in Trinius' Species Graminum, Vol. 1, fig. 27, which is unawned, slender, and with an open spreading panicle. The *A. microphylla* is a strong upright grower, with a rather narrow but dense panicle, which is 6 to 10 inches long, the branches very numerous at each joint, mostly short but of unequal length, and rather appresssed at the axis.

There were two sheaves under the name of Wild Rye grass, one of which was the *Elymus condensatus*, Presl., growing from 5 to 8 feet high, said to be very nutritious but too coarse for usual feed. The other was a much more slender grass of about 3 feet in height, the spike much resembling a *Triticum*; in fact, it seems to unite *Elymus* with *Triticum*. It is not a dwarf *E. condensatus*, for the joints of the spike are more distant, and instead of giving out 5 or 6 spikelets, there are never more than two, and in many cases the upper joints have only one spikelet. It answers to herbarium specimens labeled *Elymus triticoides*, Nutt., and I suppose it to be that plant. Apparently the same plant is in the collection of Xantus, from Lower California, as *Triticum repens*, with which it is probably often confounded.

Another sheaf was called Wild Fescue grass, from Eastern Oregon, "growing from 10 inches to 1½ feet high, full of seeds and very nutritious." This is probably the *Ceratochloa* (*Bromus*) *breviaristata* of Hooker, though smaller than his figure in Fl. Bor. Am. It is likewise the same as is collected in the mountains of Nevada, Wyoming, Utah and Colorado, and called *B. breviaristatus*, and I hardly see how it can be separated from the *B. unioloides* of Texas and Arizona. It seems to vary much in consequence of altitude, soil and climate. The awn in the Oregon specimens is very short, perhaps one-fifth the length of the lower palet, answering in this respect to the description and figure of Hooker.

The remaining species which I shall mention was a kind of fescue growing 3 to 5 feet high, which I consider an undescribed species, and will here append its characters:

FESTUCA OREGONA.—Culms tall, 3 to 5 feet, rather slender, slightly scabrous. Culm leaves few and distant, the sheaths 6 to 8 inches long, blade narrowly linear, 2 to 4 inches long; sheaths scabrous. Panicle erect, narrow, strict, but loose; branches mostly in fives, very unequal, the shorter ones nearly sessile, the longer 1½ to 2 inches, flowering nearly to the base; spikelets about 3-flowered, 4 to 5 lines long, pedicels and rachis hispid; glumes narrowly lanceolate, 2 to 2½ lines long, nearly equal to the lower

palet, 3-nerved, hispid on the keel, otherwise slightly scabrous, acute; lower palet linear lanceolate, slightly compressed, rather indistinctly 5-nerved, acute, but not awned, minutely scabrous, somewhat scarious and bronzed at the tip. Oregon.

This has some resemblance to *Festuca pratensis*, but has a denser panicle, with more numerous branches, and is not nodding but erect. The glumes are also longer, and the palets blunter and thinner. It approaches the section *Atropis* of *Poa*, which seems to connect *Poa* and *Festuca*.—GEO. VASEY.

MORE ABOUT BALLAST PLANTS.—A few days ago I paid my first visit of the season to the ballast ground near Philadelphia; some matters of interest were observed, of which I am prompted to make mention. Since the publication of my article some months ago on these new comers, I have received many letters of inquiry, as to certain plants herein mentioned, and have had a demand for specimens far beyond my ability to furnish, showing a developing interest in the matter of introduction and distribution of species.

Some plants that were very abundant last year I could find no trace of, but others in their stead of equal beauty and interest. In the following list will be noticed many species that are occasionally met with in waste grounds around cities and often in neglected country places, but it is probable that the specimens collected were from imported seeds:

Ranunculus bulbosus, L., and *R. repens*, L., both quite abundant; the former presents no variation from its usual condition, but the latter is the typical form: prostrate, very hairy, and sending out long runners, exhibiting the same characters as specimens from Europe now in my herbarium. There is, however, a plant growing along the shores of the Delaware River near Philadelphia, that I have been familiar with for the last twenty years, and have never seen it produce a runner of any kind, or show any disposition that way. It is upright in habit, often very smooth, with leaves three times the size of those on the ballast plant. Prof. Gray, to whom I sent a specimen last year, writes me, that it is one of the many forms he has had to refer to *R. repens*, L. When I have examined some of our *Compositæ* and been sorely puzzled to know what species they were on account of their close resemblance one to another, and have remembered this *Ranunculus* with its many variations, and so strikingly different in habit, appearance, &c., I have asked myself the question, what is a species, and what are characters on which species and varieties are based?

Erysimum cheiranthoides, Br., has sparingly occurred in former years, but I found only one specimen.

Three species of *Diplotaxis* are quite common, *muralis*, Boiss., *monensis*, Hudson, and *tenuifolia*, Boiss. The last seems to be fast gaining a foothold.

Thlaspi arvense. L., one specimen collected. It has occasionally been found in former years.

Camelina sativa, Crantz, is quite plentiful, some of the specimens more than two feet in height. This species occurs frequently in grain fields and on roadsides, but usually not of such luxuriant growth.

Lepidium ruderale, L., is very abundant. Two specimens of *Lepidium campestre*, L., were collected. I have seen this occasionally on roadsides in the vicinity of Philadelphia, but it is rarely met with.

Senebiera coronopus, DC., and *S. didyma*, Pers., are both abundant.

Sisymbrium Sophia, L., not so plentiful as in former years.

Reseda Luteola, L., is becoming quite common.

Silene inflata, Sm., and *S. noctiflora*, L., are as abundant as I have ever seen them.

Silene dichotoma, Ehrh., one plant only was seen. This is the first time it has been found here.

Lychnis vespertina, Sibth., and *L. diurna*, Sibth., are quite common again this year

Potentilla reptans, L., and *P. anserina*, L., are both abundant. The former seems more inclined to produce flowers than in former years.

Poterium sanguisorba, L., a single specimen was collected. It has not been detected on the ballast deposits before.

Trifolium hybridum, L., has not yet appeared. It was quite abundant last year and in one locality seemed likely to become established, but the "March of Improvement," has eradicated it entirely from that spot.

Vicia Cracca, L., but a single specimen was found. It being so showy in flower it will scarcely survive the season, as "the boys" carry off most of the attractive plants.

Centaurea Cyanus, L., is quite common again.

Carduus pycnocephalus, Jacq., a single specimen appeared last year for the first time, now thirty or forty plants are growing in a space not more than fifteen feet square.

Anthemis nobilis, L., only one specimen collected; a plant was growing near the same locality last fall but it did not flower.

Veronica hederæfolia L., and *V. Buxbaumii*, Tenore, are both in flower, but are not plentiful.

Echinospermum Lappula, Lehm., is just coming into flower, was quite abundant last year.

Echinospermum Redowskii, Lehm, is growing very luxuriantly on the railroad embankment. This according to Gray's Manual occurs on the Western plains and at St. Paul, Minnesota. The single marginal row of stout prickles on the nutlets is well marked, and it seems to flower much earlier than the other species.

Myosotis arvensis, Hoff., is growing in a few places.

Asperugo procumbens, L., one specimen only. This was first detected by Isaac Burk, of Philadelphia, about two weeks ago.

Linaria spuria, Dest., will be abundant again this year.

Carex hirta, L., is growing quite luxuriantly, and if not molested will firmly establish itself; the creeping roots are spreading rapidly in all directions.

Alopecurus agrestis, L., was collected in two localities. I found but one specimen of it last year.

On a lot of new ballast was growing *Godetia quadrivulnera*, Spach., and *Gilia capitata*, Douglass, both Western species. I am puzzled to know how they got here, unless some ballast from California has been deposited, which I have not been able to ascertain. Some half dozen species of each were collected.

This transportation of seeds and consequent introducti n of new plants, as I have repeatedly remarked, is an interesting matter for consideration, and as I review these ballast deposits, and detect so many strangers, I feel a re-awakening of that interest which a ramble about our fields and woodlands fails to create.—Isaac C. Martindale, *Camden, N. J.*

Notes on Winter Flora of Florida.—Christmas day, 1876, found myself and family in the much praised, over-rated town of Jacksonville. From Savannah we had been accompanied by constant rains, thus giving me little opportunity to dodge out at the stations and secure specimens of Natural History in any department. In that Mecca of Northern travel, Jacksonville, I saw but little of interest to a naturalist in the way of Botany. The Live Oaks and the *Tillandsia* which shrouds them serve to render the town more pleasant than it would otherwise be. The Mistletoe seems to be playing havoc with many of the trees. At this season I did not expect to obtain very many flowers in bloom, and a recent frost had destroyed many species, natural and cultivated. Having therefore looked over the city so far as we could in the midst of a constant drizzle of rain, we prepared to leave for a more favored section. St. Augustine

was chosen for obvious reasons. A ten hours ride by river and rail brought us to the "Ancient City" as its antiquated people delight to call it. The beauties of the floral scenery of the St. Johns have been so often recounted by admiring tourists that I will say little. There is something of interest to the lover of nature in its grand old Live Oaks, Cypress trees, Palmettoes, and other peculiar forms of the vegetable world that ornament the banks in a dense overhanging canopy of green or gray.

Having said this much in a general way, I will now note such species of plants as I found in blossom, leaving for another time much that was interesting about the foliage and hardy parts of a flora that possesses even in its winter dress an exceeding interest. At St. Augustine I collected in January, *Aster flexuosus*, Nutt., abundant on salt marshes; *Houstonia rotundifolia*, Gr., in woody situations; of Ferns, which always attract the eye, some species are abundant; on the roofs of houses and trunks of trees, *Polypodium incanum*, Swtz., and *Vittaria lineata*, Swtz., the latter confined to the palmetto. In the pine barrens near the city was found *Pteris aquilina*, L., and its variety *caudata*. The list from St. Augustine is meagre, but an examination of my collection will show a large number of species representing the wood, foliage, etc

At Cedar Keys I found a more interesting field by following the footprints of Dr. Garber who collected here last year I believe. The results obtained from Jan. 15th to to Feb. 10th are: On Sea Horse Key, *Gelsemium sempervirens*, Ait., *Chaptalia tomentosa*, Vent., *Solidago* ——— ? *Physalis lanceolata*, Mx. On the mainland I obtained *Pinguicula pumila*, Mx, *Pinguicula lutea*, Walt., *Lycium Carolinianum*, Mx., both in flower and fruit. *Borrichia frutescens*, DC., the two last on salt marshes near high tide. The *Lycium* I found on both coasts.

On Way Key, *Crotolaria ovalis*, Pursh., *Chiococca racemosa*, Jacq., *Alnus serrulata*, Ait. On Cedar Key, *Vachellia Farnesiana*, W. and Arn.

The *Ceratiola ericoides*, Nutt., and *Zamia integrifolia*, Willd., are abundant on the main land, and with many other evergreen forms add beauty and variety to the landscape.

In the vicinity of Gainsville I secured, *Vaccinium corymbosum*, L., *Astragalus obcordatus*, Ell., *Ascyrum amplexicaule*, Mx., *Vaccinium myrsinites*, Mx., *Hypoxis erecta*, L., *Viola sagittata*, Ait., *Viola primulæfolia*, L., *Prunus Caroliniana*, Ait., *Cornus florida*, L., *Cercis Canadensis*, L., *Acer rubrum*, L., *Pyrus arbutifolia*, L. var. *erythrocarpa*, *Chaptalia tomentosa*, Vent. Of ferns, *Asplenium ebenum* and *Woodwardia angustifolia* were found near the "sink." The curious *Lycopodium alopecuroides* and *Sphagnum squarrosum*, occur in wet, pine barren bogs. The yellow Jessamine exists by millions everywhere, climbing trees to the height of twenty feet or more. The *Utricularia subulata*, L., is found at Baldwin in ditches and shallow ponds.

My observation was that the climate of the West or Gulf coast is much more equable and mild, than on the Atlantic slope, a fact which the more advanced state of vegetation, from Cedar Keys to Gainsville fully proves.—W. W. Calkins, *Chicago, Ill.*

Recent Publications.—*Contributions to American Botany, VII.*—Descriptions of New Species of Plants, with revisions of *Lychnis*, *Eriogonum* and *Chorizanthe*, by Sereno Watson.

This is a pamphlet of about 35 pages and shows how busy Mr. Watson has been. He has here described nearly 50 new species of plants and has revised three genera, one of them an exceedingly large and difficult one. *Lychnis* is revised with eleven species belonging to America, five of them being new. One glancing over their range is struck with the fact that every one of them, with perhaps the exception of one, is confined to Greenland and high north or to the summits of Western mountain peaks. Prefacing his revision of *Eriogonum*, Mr. Watson remarks that seven years only have elapsed since the revision of the *Eriogoneæ* by Dr. Gray, but so many new species have

been described that it seems not useless to give again a summary of the two larger genera of the group. This is an enormous western genus, numbering 95 species, seven of them being described for the first time in this contribution, six by Mr. Watson, and one by Prof. Porter. *Chorizanthe*, a polymorphous genus, with which the genus *Centrostegia* is united, numbers 25 species, six of which are here described for the first time. Besides these three, twenty other genera have received an accession of species. *Amarantus* has received five new species; *Habenaria*, three; *Lavatera*, *Lupinus*, *Œnothera* and *Elaterium*, each two; *Thelypodium*, *Malcastrum*, *Psoralea*, *Lythrum*, *Mentzelia*, *Angelica*, *Mirabilis*, *Abronia*, *Rumex*, *Orytheca*, *Atriplex*, *Corallorhiza*, *Sisyrinchium* and *Erythronium*, each one.

Catalogue of the Society for the Exchange of Plants, Budapest, Hungary, 1876.—This catalogue is of large dimensions and contains some very valuable plants. Richter Lajos especially desires to receive *Rosa*, *Rubus*, *Orchis*, *Scleranthus*, *Hieracium*, *Elatine*, *Viola*, *Primula*, *Salix*, *Verbascum*, *Pulsatilla*, and *Polygonum aviculare*.

Proceedings of the Academy of Natural Sciences of Philadelphia, Part I.—January, February, and March, 1877.—The botanical papers are not numerous or lengthy. The first paper is the termination of a little discussion begun and carried on in *Nature* by Dr. Gray and Thos. Meehan in reference to the fertilization of *Browallia elata*. The next paper of botanical interest is a List of Ballast Plants in the neighborhood of Philadelphia, by Isaac Burk. The list numbers 125 species, giving the locality of each and also its native habitat except when it belongs to the British coasts. M. C. Cooke has a paper on the *Valsei* of the United States. Among the *Valsei* he includes the names of only two genera, namely, *Valsa* and *Melanconis*. The paper is presented as a contribution towards the more complete and satisfactory knowledge of the Fungi of the United States. *Valsa* numbers 133 species, and *Melanconis* five. Mr. Meehan also has some short papers, or rather notes, on "Influence of Nutrition on Fertilization," "The Bluebird and Holly Berries," "Vitality of Seeds under Low Temperature," and "Evolutionary Law, as Illustrated by Abnormal Growth in an Apple Tree."

American Naturalist, July.—*Habenaria rotundifolia* must be called *Orchis rotundifolia*, as after examination of live plants sent to the Botanic Garden, Dr. Gray has found the plant to be a genuine *Orchis* and a true congener of *O. spectabilis*. Dr. J. H. Mellichamp has a note recording some late observations made by him upon the intoxicating power of the sweet secretion of *Sarracenia variolaris*. In 1874 he had stated that the sweet secretion was simply a lure to insects and not stupefying or intoxicating, but another observer having arrived at conclusions directly opposite, fresh experiments were made which resulted in the same conclusions that were first arrived at. Dr. Mellichamp also sent two phials of the fluid found at the bottom of the Sarracenia tubes. Experiments were made in the Botanical Laboratory and confirmed the following statement made by Dr. Mellichamp: "Pour out a teaspoonful or two of the fluid in an ounce measure, or a small wine glass. Throw in a fly so that his wings will be wet or slimed. He will in a few minutes cease to struggle and will apperr as if dead. Take him out after a while and let him dry, and in about half an hour he will revive." The experiments with the fluid are still in progress, and we are promised the detailed results in the August Naturalist.

THE GERMINATION OF THE GENUS MEGARRHIZA, TORR.; *by Asa Gray*.—The following article is of such general interest that we quote it entire from the *Am. Jour. of Science and Arts* for July:

"The object of this brief communication is to describe a peculiar strucrure which *Megarrhiza Californica* exhibits in germination, and to call for observations upon other species, at the time of germination, in the hope of thereby extending our present imper-

fect knowledge of this genus of big-rooted *Cucurbitaceæ* of our Pacific coast. For the extraordinary peculiarity in question, being one which, in other cases, is known to exhibit itself in certain species of a genus (as in *Anemone* and *Delphinium*), and not in others, so it may in the present genus give aid in distinguishing the five species which have been characterized upon more or less incomplete or scanty materials.

"The first species known was from Oregon; the specimens, being in flower only, were referred in Hooker's Flora Borealis Americana, i, 220, to *Sicyos Angulatus*, but were separated in Torrey and Gray's Flora of North America, i, 542, under the name of *Sicyos Oreganus*. In the course of time it was found that there was a similar if not identical species in California, and apparently more than one, that they were perennial from very large and fleshy roots, that, while the flowers much resemble those of *Echinocystis*, the seeds were turgid, marginless, and with thick and fleshy cotyledons. Dr. Torrey, upon whom the examination of these plants devolved, many (about thirty) years ago proposed for them the generic name of *Megarrhiza;* but he refrained from publishing it, even omitted all mention of it in his account of Dr. Bigelow's excellent collection made in Whipple's Expedition (Pacif. R. Rep. iv, 1857), although good materials of that and other collections were in his hands, because he could not make up his mind whether he had to do with one variable species or with two or three. But in the sixth volume of the Pacif. Railroad Rep., which bears the same date of 1857, in Dr. Newberry's list of plants collected in Williamson's Expedition (p. 74), two species are enumerated, thus:

"*Megarrhiza Californica*, Torrey. Petaluma and Sonoma, California; April, in flower.'

"*Megarrhiza Oregana*, Torrey. On the shores of Klamath Lake and banks of Willamette River, O. T.; August and September, in fruit."

"Before this, however, viz: in March, 1855, Dr. Kellogg, of San Francisco, communicated to the California Academy of Natural Sciences (Proc. Calif. Acad., i, 38), an account of one of these species, apparently the second, under the name of *Marah muricatus*.

"A few years later, some plants having been raised in France from Californian seeds, M. Naudin (in Ann. Sci. Nat., ser. 4, xii, 154, t. 9, under date of 1859, but, as the letter-press shows, not printed until 1860 or 1861), published the plant which Dr. Torrey had called *M. Californica* under the name of *Echinocystis fabacea*. This extension of *Echinocystis* was adopted by Bentham and Hooker in their Genera Plantarum. It was, moreover, anticipated by Dr. Kellogg, who, in a second communication to the California Academy, under date of June 4, 1855, re-describes his former *Marah muricatus*, states that it 'legitimately belongs to *Echinocystis*,' and gives it the name of *E. muricatus*. When, shortly after Dr. Torrey's death, I superintended the printing of his account of the plants collected on our Pacific coast in Wilkes' Expedition, I found that he had left the article on this genus unwritten, and apparently had not determined either upon the number of the species or upon the distinctness of his proposed genus.

"When in the recent preparation of the Botany of California the subject came to be studied anew by Mr. Watson, with the aid of more extensive materials, and when these materials were found to exhibit such diversities that at least five species had to be recognized (Bot. California, i, 240), with notable differences in ovary, fruit, seeds, etc., but no approximation to the eastern *Echinocystis*, it could hardly be doubted that Torrey's genus ought to be reinstated; and this was accordingly done.

"The *M. Californica* had been raised in the Botanic Garden of Harvard University many years ago, but I had not seen the germination; and we were never able to bring the plant into blossom, as it invariably died down to the ground soon after making a moderate growth. On germinating some fresh seeds early this spring, I was somewhat surprised to find that they came up in the manner of beans. Instead of remaining

hypogæous, as from the great thickness of the cotyledons would have been expected, the body of the seed in its shell was raised well out of the soil upon what seemed to be a well developed radicle, like that of *Echinocystis*. If the cotyledons had expanded, though remaining fleshy, in the manner of *Phaseolus*, the difference between this and *Echinocystis*, with cotyledons truly foliaceous in germination, would be much less than had been supposed. I waited long to see if this would occur; I also waited in vain for the expected development of the plumule from between the bases of the fleshy cotyledons. After the lapse of about a fortnight, the plumule in all three of my germinating plantlets came separately out of the soil of the pot; and, on exposing the whole to view, the following state of things came to view: The plumule came forth from the base of what appeared to be an elongated radicle (of two or three inches in length); and below this the thickening of the root, which acquires enormous dimensions in old plants, had already commenced. A large amount of the nourishing matter stored in the cotyledons had been carried down to the root and used in its growth as well as that of the plumule. The latter came from a cleft at the very base of the seeming radicle, which otherwise appeared to be solid. But on cutting it across toward the base this was found to be tubular; and later, when more spent and beginning to wither, this stalk was separable from above downward into two.

"This, therefore, is a case in which long petioles to the cotyledons (of which there is no appearance in the seed), connate into one body, are developed and greatly lengthened in place of the radicle, which is thus simulated. It is the same as in *Delphinium nudicaule* of California, and some other species; only in that genus the cotyledons expand and become foliaceous. In the horse-chestnut petioles are also developed to the cotyledons to a moderate extent, but without union, (see Gray's First Lessons, fig. 24), thus pushing the radicle and plumule well out of the firm seed-coat, in which the very heavy and fleshy cotyledons remain; and the radicle itself, as in the pea, does not further lengthen. In *Ipomœa leptophylla* the radicle remains in like manner short, while petioles to the (here foliaceous) cotyledons develope to a great length, bringing these separately out of the ground, and the plumule between follows later.

"Botanists on the Pacific coast are earnestly requested to examine the germination of all the species of *Megarrhiza*, and to compare them with the description here given. At least three species should be met with near San Francisco, and in neighboring parts of California. According to the characters assigned by Mr. Watson in the Botany of California, *M. Californica* should be known by its obovoid seeds, of less than an inch in length, with a small hilum at the narrow base: *M. Marah*, by its more numerous seeds horizontally imposed in a large fruit (of four inches in length), each seed roundish and depressed, flattened, an inch in diameter and about half as thick, with a prominent lateral hilum. *M. muricata*, by a nearly naked fruit only an inch in diameter, containing only two globose seeds of half an inch in diameter. *M. Oregana*, which is known to occur from the Columbia River to the north of California, appears to have seeds resembling those of *M. Marah*, but rather smaller; but they are not well known. The remaining one, *M. Guadalupensis*, of Guadalupe Island, off Lower California, is much out of ordinary reach, unless it should be found in the southern part of the State. Mature fruits and seeds of all the species are much desired."

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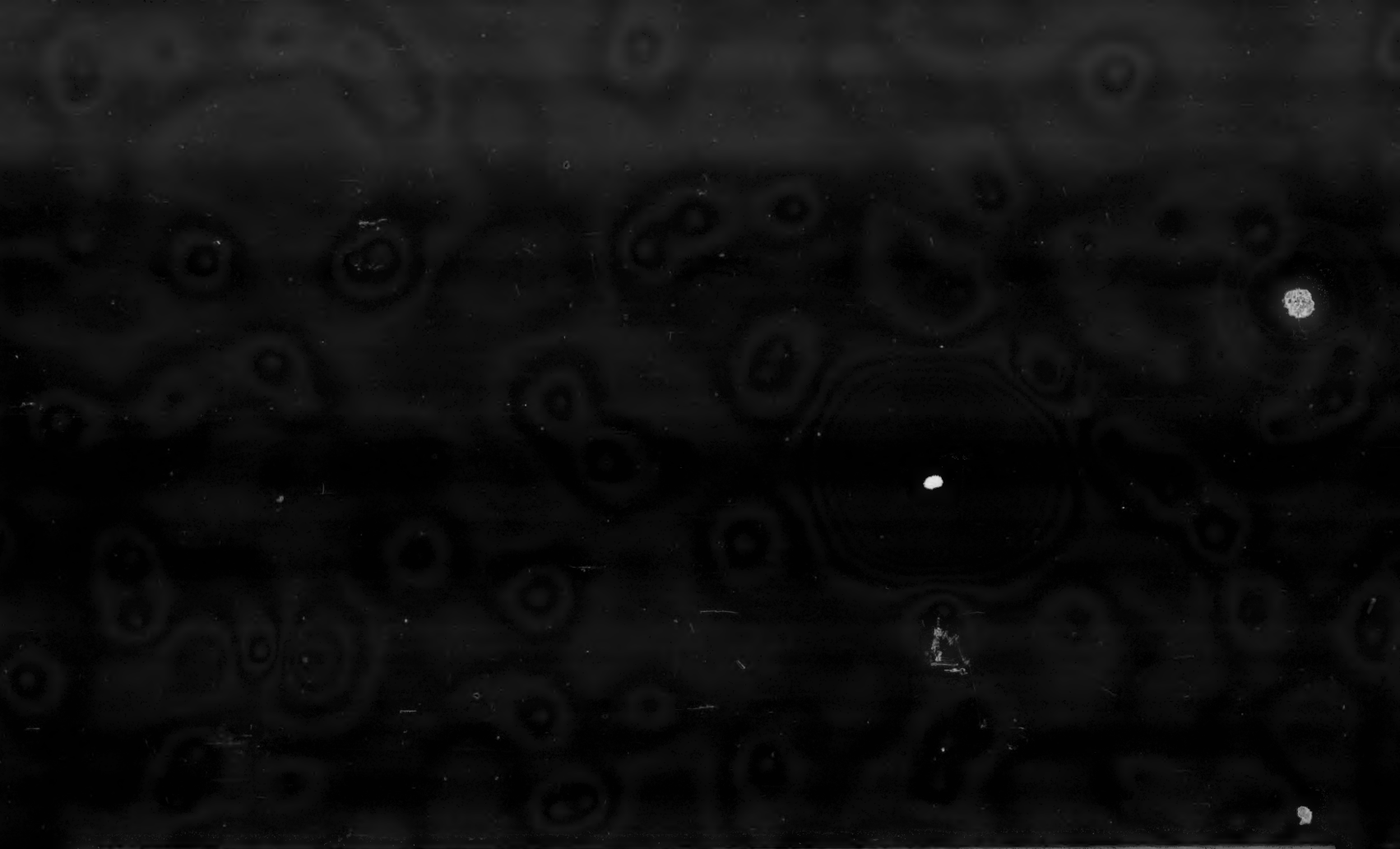
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